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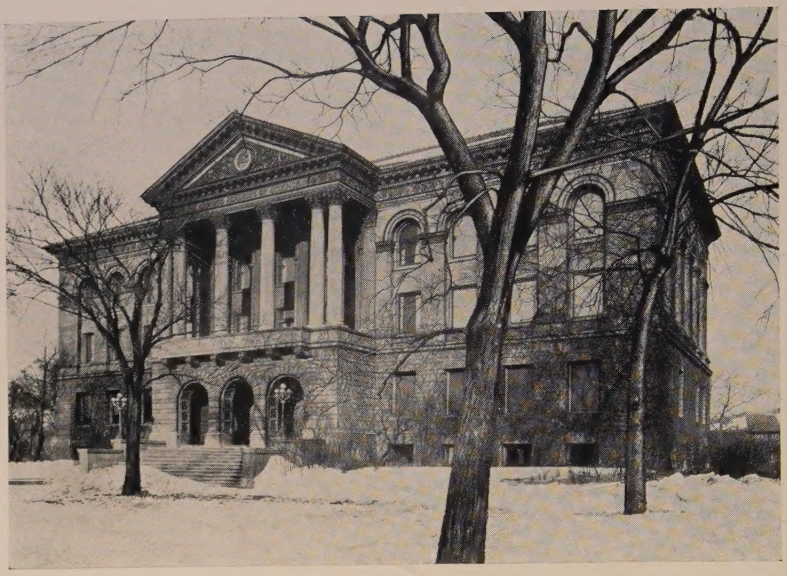

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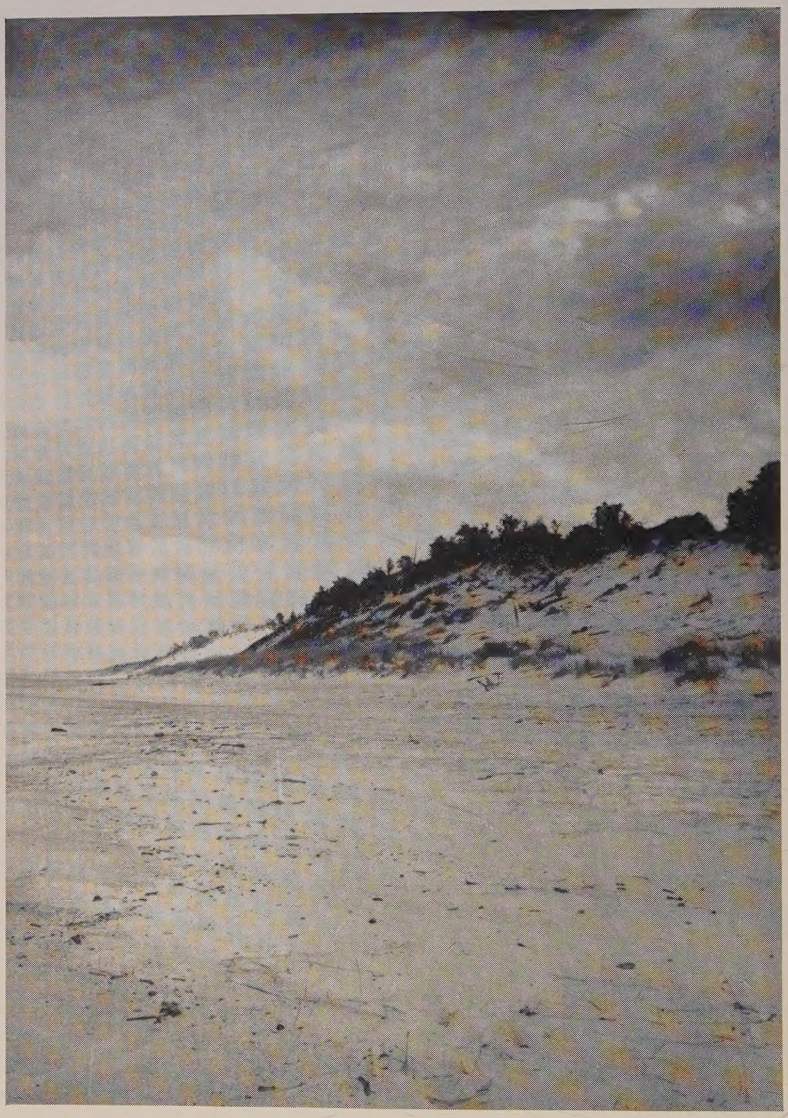


Beach and fore dune habitat of the wolf-spider near Dune Acres.

Geolycosa, The Wolf of the Dunes

Donald C. Lowrie

There ne'er were such thousands of leaves on a tree,
Nor of people in church or the park,
As the crowds of the stars that looked down upon me,
And that glittered and winked in the dark.
—R. L. Stevenson.

As I walked along the beach in the dunes one spring evening, a sight which greeted my eyes brought this little childhood rhyme distinctly to my mind. There, winking at me in the dark—not from the sky but from the sand—as I flashed my head-lamp from spot to spot, were countless minute points of light. Uninitiated, one might well

The wolf-spider at entrance of burrow.

believe that he had imbibed too freely or for some other reason had jumbled his up and down directions. "What," you will ask, "would someone *initiated* recognize these topsy-turvy stars to be?" Nearly as startling as the imagined inverted firmament, the answer is that these myriad reflectors are spiders' eyes. Night is the time when most spiders do their hunting and *Geolycosa wrightii* is no exception. With eyes as good as any cat's, this sand-burrower waits at the door of its burrow for some incautious insect to crawl within reach of its cat-like leap. Perhaps I should say wolf-like leap for this spider belongs to the Lycosidae or wolf-spider family. Not the least startling thing about

these hosts of spiders is their sudden, seemingly miraculous appearance in the evening. On a sunny summer afternoon any spot on the beach, fore-dune, or a blowout will show scarcely a trace of a burrow. The same spot in the evening will be well stippled with open burrows. What is the answer?

Let us sit down in the area in which we saw a pack of these "wolves" last night. As darkness descends, we watch the colorful glow of the sun on the clouds. On this particular evening we hope that the waves may be quite stilled, for we can look for more action from the spiders on a calm evening. As the sun slowly sets, in the flashing colors so well known in the dunes, we can speculate or dream—or catch a cat-nap—according to our inclinations. Our "wolves" will not show themselves until the quick-flashing, siren brilliance of the Lindbergh beacon begins to appear on the western horizon. Then, as the light becomes too faint for reading, we use a flashlight or headlamp. What do we see?

First of all little spider-stars suddenly begin to twinkle in the distance where only blackness was before. Is it magic? Do the spiders appear at nightfall like earthworms with the rainfall? Let us observe more closely. Near at hand we see a spot of sand suddenly dissolve. A small round opening appears and out comes our lustrous-eyed Arachne. This, then, is the answer to our question. As rain brings the earth worms from the sod, so does night bring the lycosas from their burrows. During the days these tubes usually are closed, especially if the wind is disturbing the sand. With her abdomen pointed upward, the spider weaves a curtain of silk over the entrance so that all signs of the opening are obliterated. If, at dawn, the sky is slightly overcast, she may leave the tube open, or if the night's catch has not been satisfying, she may not close her home, perhaps hoping for the approach of some unwary victim before she retires. Sometimes even when the burrow is closed, if no wind has disturbed the sand, the exact spot of the entrance may be determined, for the spider has left her foot marks radiating out in all directions from the nest. Each dash after a victim, successful or not, has left its mark in the sand.

If you wish to catch one of these Amazons (for the female is a warrior as well as a homebody, while the male is a carefree, burrowless roamer), you must become adept at treading lightly or at digging. When you spot one of these eyes, you must "walk softly and carry a big stick," as another nature lover has said in another connection. Of course, if you are out for the exercise, walk right up and start digging. Walking softly, however, you can approach to a position next to the hole where the spider is quietly waiting. Then with a quick slice of your "big stick" (in this case a trowel is really more helpful), you insert it beneath the spider, cutting off her means of escape to the

Wolf-spider in burrow which has been cut away to show structure. A packet of paper matches at lower right indicates size.

bottom of the tube. The trowel full of sand can then be dumped out and the spider retrieved.

If your weight is not appropriate for the silent stalking method, you can creep up to the opening with a minimum of jarring and wait there for the impatient female to reappear. During the day the few spiders leaving their burrows may be caught in much the same way, though usually they will not come to the surface even when a bit of sand is slowly poured into the burrow. If during the day or night the spiders will not oblige by coming to the doorway, you must finally abandon strategy altogether and resort to digging in earnest for this buried

treasure. You will find the technique quite an art in itself, and an interesting method as well, until the labor of digging overbalances the novelty of the reward. The excavation may be made in several ways—trial and error will teach you the best method. I have used the following to best advantage. A hole is dug close beside the burrow; then one wall of the tube is broken away with a twig, forceps, or similar rigid tool, exposing the burrow to the bottom. You will find that the burrow may not be straight. Typically, the first few inches slant a trifle. There is then an enlargement enabling the spider to turn around. From this point it drops vertically to the bottom. Often it will extend straight the whole way with only an enlargement at a depth of a few inches. You will lose many spiders at first, due to obscuring the burrow with falling sand, but if you finally reach the bottom, eighteen or twenty inches below, you will be rewarded with a large, scrambling, gray female. Her size will probably startle you, for this species, with a body nearly an inch long, is among the largest of our northern spiders.

If your interest extends beyond digging wolf-spiders out of the sand and dropping them into preserving fluid to be forgotten, you may find amusement and instruction by bringing them home for observation. If placed in a vessel as tall and narrow as a quart mason jar, one of these spiders, if not mature, may be induced to dig a fresh burrow, especially if a hole is begun in the sand. If full-grown she may have lost much of her tendency to burrow and may remain on top of the sand unless a hole is dug for her encouragement. Usually, however, with a little patient manipulating she can be stimulated to resume her natural habit.

The next problem is to provide food. She has a voracious appetite and, like all araneida, is entirely carnivorous. Insects are her staples and a few large cockroaches will suffice for several days. Flies, crickets, grasshoppers, beetles, bugs, or any other insects which can be easily procured, are very satisfactory, and raw beef can sometimes be substituted.

Some morning in late May or June a flattened ball of silk, a quarter of an inch in diameter may be found, hanging by a thread from the female's spinnerets. The construction of this cocoon is an interesting bit of the life of Madam Wrightii which must be left for another story. On examination the cocoon will be found to be filled with from one hundred to four hundred eggs. During any sunny day our lady may be seen at the entrance of her burrow with her abdomen pointed skyward turning the cocoon with her hind legs so that all surfaces are exposed to the full rays of the sun. If the eggs have been fertilized, you may again be surprised some morning late in June or July to see this spider appear much larger and fuzzier than usual. Closer examination will reveal this fuzziness to be a mass of young

spiders. They have emerged from the cocoon and migrated to their mother's back where they crowd closely together, clinging to her fur and to each other. As she sits in her doorway, sunning herself and her young, you can observe these cannibalistic miniatures moving about and occasionally feeding upon their brothers and sisters. If the mother were still at large in the dunes, the young would begin to fare forth into the sandy wastes after a week or two of this life. Then we would find the pin-head-sized holes of the young in the vicinity of the larger burrow of the mother.

Occasionally the cocoons may yield a brood of small flies or wasps which have parasitized the eggs. Sometimes even the adult may be found shrivelled up with an innocent-looking fly pupa lying alongside. The study of this fascinating phase of life seems to have been sadly neglected for little is known of the details of this relationship.

After the young disperse they grow rapidly, enlarging their burrows with each molt, and become nearly adult by fall. The following spring, after one or two molts, they become mature, mate, and lay eggs by June. In the fall, and often in the spring, most spiders migrate by means of a "balloon"—a long, buoyant thread of silk, wafted by the breezes for great distances—an effective means of dispersal. The geolycosas probably do this although there has been no actual observation of such behavior.

At the approach of winter the female closes her burrow and hibernates at the bottom. Here we must ask more questions. Do the females of the second year have to be fecundated again? How many years do they live? We hope some day to find the answers. In the spring, as I have mentioned, when the male reaches adulthood, he will be found on the surface of the ground at night searching for the female. Again we ask, do they dig burrows when adult or do they pass the day under debris on the beach? Do they live only one year and the following summer, or do they hibernate the following year?

We have pried rather closely into the habits and home life of this lady. Therefore let us see, briefly, how this habit of living in a burrow originated. Burrowing is an old mode of life, being found in the two primitive suborders. In the higher families it is rare. The Salticidae or jumping spiders, as well as most non-web-building species, seek shelter beneath bark and in other protected places. Among the lycosids we find many individuals making a fairly permanent retreat in some protected place. Evidently there are all gradations of burrowing from a mere improved hollow on the surface of the ground to the deep sand burrows of *Geolycosa wrightii* and her relatives. Thus it would seem that this burrowing habit is a result of the change to a permanent abode. To insure the propagation of the species the male still retains a free-roving habit in adulthood.

Almost every fore-dune, cottonwood dune, or bare sandy blowout of the Lake Michigan shores of Indiana, Michigan, Illinois, or Wisconsin, or of the sandy areas of the Kankakee River Dunes is well populated with this particular species. The closely related *Geolycosa missouriensis* may also be found in the Chicago Area, but in the oak dunes and other only slightly sandy areas. Two other members of this genus are found on the east coast in comparable situations.

Ecologically this spider is one of great interest as it is clearly an index species for the fore-dune and cottonwood dune associations. The only other animal vieing for this honor is the sand-colored grasshopper, *Trimerotropis maritima.* Another interesting consideration, which is still in the speculative stage, concerns the color of the spider. A first, superficial glance inclines us to say, "This is an excellent example of protective coloration." On closer analysis we can not be so sure for only infrequently does the spider show herself above ground during the day. However, we must also remember that usually she is abroad during moonlit nights when her color matches the sand even better than during the day. This question, as well as many others, must be left until experimentation and further observation give us the answers.

Do You Know the Mammals?

Are these statements true or false?

1. The badger is a burrowing animal.
2. The cow is the only animal that chews its cud.
3. The mock turtle is a small variety of turtle.
4. The unicorn is a fabulous animal.
5. The hind legs of a horse bend the same way as do his fore legs.
6. Pocket gophers are the same as prairie dogs.
7. The ermine's coat is white only in winter.
8. The chipmunk is a kind of squirrel.
9. The coyote is a kind of small wolf.
10. The bat is a night-flying bird.
11. Porcupines when angry throw their quills.
12. The groundhog is a legendary animal.

Answers on page 29.

—Arthur M. Greenhall

The Wichita Mountains Wildlife Refuge

ROBERT S. STURGIS

SCATTERED throughout the country along the main duck and goose flyways, in breeding areas, and in the old haunts of our fast diminishing upland game birds and big game animals, are some two hundred and fifty wildlife refuges with a total area of about 12,000,000 acres. For the most part they are areas of from a few to several hundred square miles of swampy, arid, or mountainous land. Under the practical and scientific management of the U. S. Bureau of Biological Survey, they have become living monuments to the wild animals which played such an important part in building up this country—the buffalo, elk, antelope, deer, bear, beaver, and the now almost extinct Texas longhorn cattle. Since their establishment mainly during the past few years, the migratory waterfowl refuges have already not only helped to halt the alarming decrease and possible extinction of many game birds, but they have also actually increased the number of ducks, geese, and upland species, rightly a heritage of our hunters and the generations to come. To a limited extent many of the refuges are open to the public for motoring and camping, and they furnish a splendid opportunity for seeing and studying our native wild life in its natural habitat —instead of from the back of a buffalo nickel!

An opportunity for my son Bob and myself to spend the month of August, 1937, with the official family of the Wichita Mountains Wildlife Refuge was made possible by Stanley P. Young of the Bureau of Biological Survey. The principal object of our visit was to photograph coyotes,—a dismal failure, as it turned out, for just before our arrival apparently all ninety-three had been trapped by one of the Survey hunters. In addition, we planned to cooperate with the resident naturalist, Charles H. Rouse, in starting a local collection of small mammals for study, and, at Dr. Gloyd's suggestion, to collect reptiles for the Chicago Academy of Sciences. After half an hour of instruction from Dr. Gloyd, and equipped with scalpel, syringe, tags, jars of formalin, and a shipping box for live specimens—a so-called snake-pullman—we set forth as "full-fledged herpetologists," privately hoping that we never would be found in the same county with a "rattler."

The Wichita Mountains area, a very rugged outlying section of the Rockies, set aside in 1901 by President Theodore Roosevelt as a National Forest, became a wildlife refuge in 1905. It is located in southwestern Oklahoma, Comanche County, twenty-five miles north of Fort Sill. The refuge occupies a central valley-like plateau at an elevation of approximately 1,600 feet and completely surrounded by jagged, rocky peaks of very old, weathered and sculptured pre-Cambrian granite. The intermontane valleys are broad and rolling, and cut by numerous intermittent streams and dry arroyos. In August the climate is hot and dry, with temperatures often over 100° F. daily, and occasional torrential thunder storms.

The most common trees are the oaks, black jack *(Quercus marilandica)* and post oak *(Q. stellata)*. The oaks are usually found together, with the post oak dominant on the lower slopes and stream bottoms and the black jack on the upper slopes and drier sites. Next in abundance is the cedar or juniper *(Juniperus virginiana)*, followed by ash *(Fraxinus americana)*, pecan *(Hicoria pecan)*, mesquite *(Prosopis juliflora)*, and others.

The hard, rocky soil of the valleys supports excellent fodder grasses where erosion and rapid run-off from torrential rains has been checked by controlled grazing, as in the wildlife pastures where the bluestems are dominant. In the order of their importance are the little bluestem *(Andropogon scoparius)*, big bluestem *(A. furcatus)*, and silver beardgrass *(A. saccharoides)*. In the short grass area the buffalo grass *(Buchloe dactyloides)* and blue grama *(Bouteloua gracilis)* are the most important species. The most common grasses in the overgrazed areas outside the big game pastures include six-weeks fescue *(Festuca octoflora)*, rescue grass *(Bromus catharticus)*, three awn grass *(Aristida* sp.), several species of *Panicum, Eragrostis* and others. The overgrazing by privately owned cattle, which has almost turned large

sections of the refuge into an arid waste, was rightfully stopped last December when all grazing permits were revoked.

Leased pasture, overgrazed.

THE MAMMALS

The mammalian life of the refuge falls naturally into four classes: (1) the indigenous species, such as deer, coyote, raccoon, bob-cat, prairie dog, and the lesser rodents; (2) species recently introduced or reëstablished, the bison or buffalo, elk, and Texas longhorn cattle; (3) species once extant in that area; and (4) species that could advantageously be introduced.

The mammals native to the area are of considerable interest and, in most cases, abundant. To Vernon Bailey's *Mammals of the Wichita Mountains Wildlife Refuge* (1935) we are indebted for many identifications and for the general history of some of the species in this region. At the time of our visit the Survey had just completed a fully equipped laboratory for the study of all phases of the fauna and flora of the refuge. During our stay in August the very high temperatures, even at night, made the collecting of the smaller species difficult. Many specimens spoiled in the traps at night and skinning fat specimens, particularly prairie dogs, necessitated extra precautions to insure good preservation.

The following is a list of the native mammals known to exist on the refuge at the present time:

White-tailed Deer *(Odocoileus virginianus texanus.)* Deer are found almost everywhere in the refuge. The numerical increase is rapid and the herd now numbers over 800. The proportion of the sexes is well balanced and there are many fine heads of antlers. Some day the management of the deer will be a problem for their natural enemies are absent. The coyotes that wander into the refuge seem more interested in the abundant rodents, and the days of the puma, the wolf and the hunter have gone.

When the deer slip out from their daytime cover to graze in the cool of the evening, visitors enjoy the sight of these graceful wild creatures so close at hand. "Dolly," the refuge's most famous doe, has spent the fifteen years of her life near the headquarters. She produced twin fawns for each of twelve years and one year proudly introduced triplets. Truly a matriarch, "Dolly" disciplines her children, grandchildren, and even great, great, great grandchildren, with impartial nips and strikes from her forefeet.

Coyote *(Canis latrans latrans)*. Coyotes are old residents of the refuge. Ninety-three were trapped in the spring of 1937 and still others came in. Constant vigilance is required to protect the increasing flocks of wild turkey, quail, and prairie chicken.

Texas Bob-cat *(Lynx rufus texensis)*. Bob-cats, so easily hunted with dogs and horses, were for some years believed to have been cleaned out, but Charles H. Rouse, the resident naturalist, has just written me that two "nice bob-cats" were trapped last winter.

Gray Fox *(Urocyon cinereoargenteus)*. The gray fox formerly must have been abundant in the many rocky portions of the refuge but none had been reported for some years until one was taken last winter.

Raccoon *(Procyon lotor hirtus)*. Raccoons were numerous and some almost became pets around the C. C. C. camp kitchens. They visited headquarters each night for special tid-bits provided by the youngsters. We tried a carrot bait with a flash powder trap-camera. Result:—a portrait of a pack-rat! One of the joys of trap-camera photography!

Black-tailed Prairie Dog *(Cynomys ludovicianus ludovicianus)*. "Official Dog Town" lies on both sides of the main motor route. The "dogs" are not molested and are therefore very tame, furnishing much enjoyment to the many visitors. These fat little rodents, although very destructive to grass, are a very real part of the great central west. They occupy only a few acres and in limited numbers they are an asset to the refuge.

As a series of study specimens was desired for the refuge collection, Bob became "official dog-catcher." Six No. 1 steel traps, with chain and drag, and an Indian "paint pony" made up his equipment. To bury traps carefully near the burrows was far too much trouble, and besides, fingers are sometimes caught. It was much simpler to drop the trap

carefully into an occupied hole and wait a couple of days. The results were ten nice specimens for study and two only slightly injured young of the year. "Nippy" is now in our Lincoln Park Zoo and "Red" is a pet on the refuge.

Striped Ground Squirrel *(Citellus tridecemlineatus texensis)*. Fairly common, although not abundant.

Texas Fox Squirrel *(Sciurus niger limitis)*. Very numerous prior to 1937 due to long protection and excellent nut crops. Now very scarce; apparently at the ebb of one of their cycles.

Flying Squirrel *(Glaucomys volans)*. Known to exist in the timber. Specimens are needed for determination of the subspecies.

Wood Rat *(Neotoma floridana attwateri)*. Very numerous. Also known as pack-rat or trade-rat. These animals make their nests among the rocks.

Cotton Rat *(Sigmodon hispidus texianus)*. Found in large numbers in the long grass areas. This species, along with the wood rat, furnishes abundant food for the predatory mammals and birds.

Brown Rat *(Rattus norvegicus)*. Not numerous; found only around the barns and camps. Individuals vary greatly from the normal brownish gray color to a pinkish brown and also to white with brown spots.

Deer Mouse *(Peromyscus boylii attwateri)*. Probably common among the rocks of the mountains but very few specimens are available.

Short-tailed White-footed Mouse *(Peromyscus maniculatus bairdii)*. Numerous in all parts of the refuge.

Pine Mouse *(Pitymys pinetorum)*. Very abundant on most of the higher mountain slopes.

House Mouse *(Mus musculus musculus)*. Found in and around buildings, but not common.

Mole *(Scalopus aquaticus intermedius)*. Mole mounds are numerous but no specimens have been taken to date.

Short-tailed Shrew *(Blarina brevicauda carolinensis)*. Commonly found in characteristic runways among rocks in the higher elevations.

Great Plains Jack Rabbit *(Lepus californicus melanotis)*. Fairly common but not to the extent of being a nuisance.

Oklahoma Cottontail *(Sylvilagus floridanus alcer)*. These large brown cottontails are really the mainstay of the carnivores and birds of prey. The balance between the rabbits and rodents versus the predators, in their relationship to the game, is an interesting and profitable study for which the refuge is well situated and adequately equipped.

Long-tailed Texas Skunk *(Mephitis mephitis varians)*. Certainly numerous prior to 1934, when over two hundred were trapped, but now very scarce.

Prairie Spotted Skunk *(Spilogale interrupta)*. Twenty-seven were trapped in 1934. Now no evidence of their existence in the refuge.

Mink *(Mustela vision)*. Five were trapped in 1934. They have

A buffalo wallow

The buffalo herd.

always been scarce but should increase with protection and the present abundance of frogs and other aquatic life.

Georgian Bat *(Pipistrellus subflavus)*. Bats in general are not numerous but probably six or more kinds are represented. Three of this species were collected in 1935.

The bison, elk and Texas longhorn cattle have been reëstablished in the refuge during recent years.

Bison or American Buffalo *(Bison bison bison)*. Since the days of antiquity the Wichita Mountains have been natural buffalo range. The original herds were wiped out in the great slaughter of the nineteenth century. The present herd of over 350 fine, smooth-coated monarchs of the range, contentedly grazing in their ancestral home, is the offspring of fifteen individuals introduced in 1907. The yearly surplus is disposed of to zoos or parks, or used for meat.

Riding over the range one can observe the deep-worn, century old buffalo trails, wallows, and drinking holes. Many a large boulder has been polished by the rubbing of countless generations of buffalo. We are certainly indebted to the far-seeing conservationists who have assisted in saving these splendid animals.

Rocky Mountain Elk *(Cervex canadensis nelsoni)*. Early records tell us little of the original native elk except that they existed in this area. The present herd, numbering over 250, originated in 1911 when five were brought in from the Jackson Hole country. The annual surplus is disposed of as in the case of the buffalo.

The elk, a really noble animal, is, next to the moose, the largest of the deer family. To see a band of elk grazing on a ridge, outlined against the sky, is an unforgettable sight. For big animals they are fast runners. Often in the pastures they will race a car going thirty-five miles an hour and invariably cross the road ahead.

Texas Longhorn Cattle. The longhorn cattle are as much a part of our early western history as the buffalo and for this reason they deserve a place on the refuge. After a little expense and much effort, a small herd of the true Texas type was assembled in 1927. The herd now numbers over a hundred. Anyone seeing these magnificent animals today will consider the effort worth while.

The longhorn bull is a strict individualist, caring not for god, man nor beast. The original herd contained some notable examples. "Old Broad" and "Old Brown" fought man and horse until they died. Many a cowpuncher has lost his hat and knocked down a couple of corrals in his hurry to get out of their way. "Spots," a black and white spotted steer, passed out of a life of fighting, rigidly defying a thunder storm in the middle of an open pasture. Lightning was something with which he could not cope!

Among the species once extant in the Wichita Mountain area but no longer present are the beaver and the larger carnivores. The latter have been eliminated during recent years and must be kept out despite our personal admiration and respect for some of their qualities.

Gray Wolf *(Canis lupus nubilus)*. There is some question as to whether or not the big gray wolf is completely absent from the Wichitas. Several were shot in 1933 and, although reports from the C. C. C. boys indicate that they might still be present, there is no conclusive proof. What a thrill it would be for the campers to hear on a quiet moonlit night the full-throated call of old Lobo!

Texas Red Wolf *(Canis rufus)*. There is little doubt that this species once existed in this area but proof of its occurrence during recent years is lacking.

Mountain Lion *(Felis concolor stanleyana)*. The mountain lion (puma, couger or panther) of the Wichita Mountains was exterminated by the cattle men in the early days. Although they must have been numerous at one time, the last known kill was in 1908.

Prairie Red Fox *(Vulpes regalis)*. Red foxes were trapped in 1934 and are thought to have been plentiful prior to that date.

Black Bear *(Euarctos americanus)*. Black bears seem to have disappeared from the Wichitas since a few were shot in 1934.

Bears are great wanderers and if a few should sometime come into the refuge they should be protected. There are ample acorns on the ridges and excellent cool ravines which would be suitable habitats. To quote Vernon Bailey, "a few bear would certainly add interest to the

The herd of Texas Longhorns.

wildlife and it is important to protect native species that will soon disappear from the surrounding country."

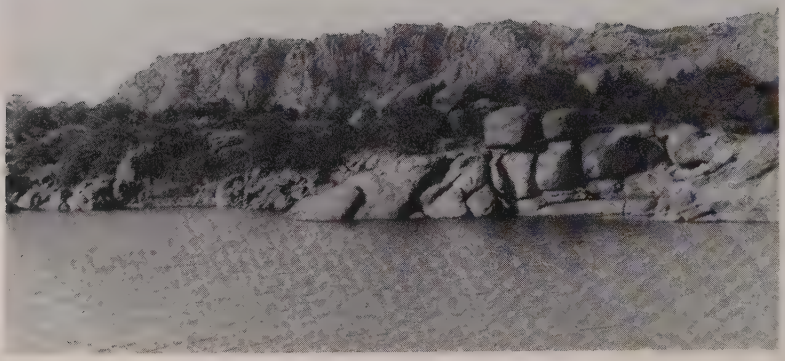
Texas Beaver *(Castor canadensis texensis).* Although found on neighboring streams, beavers are now absent from the refuge. If a few wander in they, like the black bear, would add greatly to the public interest.

Species that could advantageously be introduced in the refuge are the picturesque plains antelope, mountain sheep and wild horses.

An attempt to introduce antelope was made in the late nineteen twenties. The specimens were obtained from Alberta, Canada, and because of the different climate and various other conditions the attempt failed. As opportunity permits, the Survey will try again, obtaining a stock from less remote territories and from a similar life zone. Antelope will mix well with the buffalo, elk and deer in the great open pastures and these quick-moving, graceful animals will add much of general and scientific interest to the refuge.

An unsuccessful attempt was made to introduce mountain sheep, using stock from Alberta as in the case of the antelope. The rough mountainous portions of the Wichitas appear to be quite suitable for the "big horns" and it would be fascinating to see these shaggy denizens of the upper heights climbing among the many peaks and rock walls of the refuge.

Wild horses have grazed over the Wichitas since the days of the Spanish *conquistadores* and were part of the scenery and history of



Reservoir Lake under Elk Mountain.

the region until a few years ago when apparently all but two were driven out. These two shaggy stallions, with manes almost to their knees, could not be captured and are still seen occasionally among the elk. If a couple of mares were added, in a few years from now the sight of a small band of wild horses dashing up a draw or over the skyline, manes and tails flying, would be an unforgettable experience.

THE REPTILES

The Wichita Refuge is amply supplied with variety and numbers of lizards and snakes and, although two poisonous species are present, danger from snakes is practically non-existent as far as visitors are concerned. Collecting snakes is an interesting and fascinating diversion for they seem never to be where they should be, and to turn up at the most unexpected times and places. It might also be said that "live collecting" is fairly sporting. A chase among the rocks after a big diamond rattler, holding him down with a broom, slipping the noose over his head, and depositing him in the bag will make us amateurs, at least, hold our breath more than once!

When collecting in an area it is good policy to let everybody know about it for many desirable specimens will come from unexpected sources. A beautiful little worm snake, a rare species *(Leptotyphlops dulcis)*, was brought to us by the wife of one of the enforcement officers who found it on her doorstep after a heavy rain. One of the officers found and helped capture a large rattlesnake in a culvert.

Some of the copperheads captured under lumber piles, along the road and under the cow barn were reported by workmen, and the boys of the "official family" brought in most of the lizards and smaller ribbon snakes and water snakes.

Photo by H. K. Gloyd

Western Diamond Rattlesnake.

The larger specimens were shipped alive to the Academy and the smaller ones preserved in formalin to be added to the collection later. Charles H. Rouse, resident naturalist, has identified twenty-two species of snakes and believes that several more exist. During our stay at the refuge we obtained specimens of the following reptiles, identified by Dr. Gloyd:

Lizards

Collared Lizard or "mountain boomer" *(Crotaphytus collaris collaris).*
Six-lined Race-runner *(Cnemidophorus sexlineatus sexlineatus).*
Prairie Spiny Lizard *(Sceloporus undulatus consobrinus).*
Sonoran Skink *(Eumeces obsoletus).*

Snakes

Worm Snake; Blind Snake *(Leptotyphlops dulcis).*
Ring-necked Snake *(Diadophis punctatus arnyi).*
Brown Whip Snake *(Masticophis flagellum flavi-gularis).*

Pilot Black Snake *(Elaphe obsoleta obsoleta).*

Bull Snake; Prairie Gopher Snake *(Pituophis sayi sayi).*

Water Snake *(Natrix erythrogaster transversa).*

Marcy's Garter Snake *(Thamnophis marcianus).*

Western Ribbon Snake *(Thamnophis sauritus proximus).*

Some of the specimens of this species had yellow or greenish yellow dorsal stripes while others had stripes of bright red.

Broad-banded Copperhead *(Agkistrodon mokasen laticinctus).*

Western Diamond Rattlesnake *(Crotalus cinereous).*

Bird life of all kinds is rigidly protected in the refuge. Wild turkeys are doing well and are numerous. Ten or a dozen old toms regularly make headquarters their roost. These magnificent birds, their coppery feathers glistening in the sun, add much to the enjoyment of visitors. Although scarce as yet, quail and prairie chicken are fortunately on the increase. Winter feeding of Kaffir-corn is a great help. Duck feed is being planted and migratory ducks are using the many new lakes in increasing thousands.

In a few years, when the lakes are opened to public fishing, the refuge will be a fisherman's paradise. Lakes and ponds have been abundantly stocked with game fish such as crappie, bass, bream and perch. One may be able to "camp out" on a beautiful lake and catch breakfast from a bedding roll!

In the Wichita Mountains Refuge the skill, diligence and energy of the Biological Survey have produced most gratifying results and the Bureau is to be commended for having established a program which will utilize to such good advantage the natural features of this region in perpetuating the existence and providing for the study of some of our most interesting and valuable wildlife.

Dr. Pettingill to Lecture on Birds

Under the auspices of the Illinois Audubon Society, Dr. Olin Sewall Pettingill, Jr., will give an illustrated public lecture "Adventures with Birds" on Friday, April 7, at 8:00 P.M. in the auditorium of the Academy. There will be no admission charge.

With motion pictures in natural colors, this lecture describes episodes in the life histories of such common birds as the black-billed cuckoo, goldfinch, bluebird, red-winged blackbird, and others. Also included is a film showing studies on the Atlantic puffin on Machias Seal Island, off the northeast coast of Maine.

Dr. Pettingill is Instructor in Zoology at Carleton College, Northfield, Minnesota, and Secretary of the Wilson Ornithological Club.

The Eighty-second Annual Meeting of the Academy

THE eighty-second annual meeting will be held Monday, April 10, 1939, at 8:00 P. M. in the auditorium of the Academy building. After a brief address by the president, Dr. Nathan S. Davis, III, and a short business session for the election of officers, Dr. Fay-Cooper Cole, Professor of Anthropology at the University of Chicago, will speak on the subject of prehistoric man in Illinois.

FAY-COOPER COLE

Dr. Cole is preëminent in the field of anthropology and his lecture "Rediscovering Illinois" describes investigations carried on during recent years by the University of Chicago. Excavations have revealed that several different culture groups occupied the Illinois region at various periods. A very early, long-headed, hunting population was superseded by semi-nomadic groups who built mounds for burial purposes. These were followed by other Indians, primarily agricultural, who built large settlements and erected truncated pyramids on which they constructed public buildings and religious structures. The chronological order of their existence has recently been determined and some of these antiquities are dated even in years by means of dendrochronology, or tree-ring dating.

Members and friends of the Academy are urged to be present and to bring guests if desired. The lecture is open to the public.

MUSEUM ACTIVITIES

Museum Improvements

The northeast corner of the first floor of the Academy building, formerly occupied by officials of the Chicago Park District, has been made available for the use of the Academy and is now functioning as the administrative offices of the Museum of Natural History. The space is well adapted for this purpose and no changes in doorways or partitions were required. The rooms have been redecorated and equipped with asphalt-asbestos floor covering and new furniture. Opening directly into the museum lobby, the largest room serves as a reception room and office for the secretary. Adjoining this is a space which will be used for meetings such as those of the Board of Trustees, Scientific Governors, and the museum staff. The Director's office is in the extreme northeast corner.

This additional space and equipment provides a much more efficient arrangement of museum activities in several ways. Moving the public office out of the Children's Library releases much needed space for the reading room in which more books and periodicals are to be made available. Administrative work will be less frequently interrupted by visitors to the library. In the basement room, formerly used as the office of the Director, the scientific library will be arranged so that it can be conveniently used by the museum staff and members of the Academy.

The taxidermy laboratory has been enlarged by the removal of partitions no longer advantageous, and new equipment, such as benches, tables, and power machinery, is being installed.

New Members

The following were recently elected to membership in the Academy:

Life

Philip D. Evans, Kansas City, Mo.

Sustaining

Dr. Gustav Egloff

Associate

A. Pierce Artran
W. N. Critchfield
Edward E. Edstrom
Eugene T. Frankenhoff
James A. Fox
Robert Guillaudeu
Norman R. Hallock
Mary Hutchings
Helen M. Jewell
Henry J. Lalley
Elizabeth Macklem
Thaddeus Murroughs
Walter R. Spofford
Dorothy Stirling
E. W. Youngren

Reference Library

The reference library of the Academy has been fortunate recently in obtaining many new and valuable accessions. Among the most important of these are sets of all the American bird-banding periodicals received from the estate of the late William I. Lyon, which it is hoped may be kept up to date for the benefit of the many local bird-banders. Mr. Lyon's extensive collection of mis-

cellaneous literature on bird-banding also came to the Academy, and we hope that workers in this field will send reprints of their subsequent papers so that the present excellence of the collection may be maintained.

Through the kindness of Mrs. Rosalie Edge, we received a practically complete set of the publications of the Emergency Conservation Committee, which will prove exceptionally valuable in the history of the conservation movement in the United States. Miss Mabel E. Smallwood has continued to donate the *Journal of Heredity* and the *Quarterly Review of Biology*. The Cranbrook Institute has given a complete series of its publications and the Colorado Museum of Natural History has nearly completed our set of its papers.

New Publications Issued by the Academy

A new series of Museum Leaflets for the purpose of helping amateur naturalists become acquainted with the animal and plant life of the Chicago Area was recently initiated. In the form of condensed lists of local species of various groups they will serve as a convenience in field studies and as a guide to the literature. The following are now available for free distribution:

No. 1, *Check List of the Reptiles and Amphibians of the Chicago Region,* by Walter L. Necker, September, 1938.

No. 2, *Check List of Winter Birds of the Chicago Region,* by Edward R. Ford, January, 1939.

In the *Bulletin* series, No. 8 of Volume 5, *A Synopsis of North American Birds of Prey and Their Related Forms in Other Countries,* by Major L. R. Wolfe, 42 pages, 10 maps, was published in December, 1938, price 25 cents. The *Bulletin* contains more technical articles too short for the *Special Publications* series and the various numbers, issued at irregular intervals, are sent on request without charge to active members of the Academy.

Notes from Affiliated Societies

STATE MICROSCOPICAL SOCIETY OF ILLINOIS

The Microscopical Society has held regular meetings on the third Friday of each month during the past year. On some occasions microscopic demonstrations have been the principal feature of the meeting; at other times public lectures and motion pictures have been presented. The subject matter has varied from popular talks on microscopy as a hobby to more technical lectures on the applications of optical instruments in crime detection and the use of polarized light.

At the annual meeting of the society, February 3, 1939, the following officers were elected: President, J. E. Nielsen; Vice-President, E. C. Hood; Corresponding Secretary, Dr. V. A. Latham; Recording Secretary, Miss L. C. Nielsen; Treasurer, W. L. Necker.

THE ILLINOIS AUDUBON SOCIETY

The Bulletin of the Illinois Audubon Society is now to appear four times a year instead of annually. The first number for 1939, edited by Mr. Edward R. Ford, will appear early in April.

The collection of colored lantern slides for bird study, maintained jointly by the Audubon Society and the Academy, is being augmented by new additions and replacements this spring. These slides are loaned, free of charge, to members of the two organizations and to teachers in the Chicago Area. Requests for such loans should be made of Miss Grace Z. Harsch at the Academy.

In commemoration of the National Wildlife Restoration Week, March 19-25, sponsored by the National Wildlife Federation, Washington, D. C., a new set of wildlife poster stamps has been issued. This extremely attractive series includes eighty pictures of birds, mammals, fishes, trees, and wild flowers, reproduced from the work of well-

known artists, and may be obtained from the office of the Audubon Society at the Academy at $1.00 per set. Funds resulting from these sales are used by the Federation to support activities in conservation.

THE CHICAGO ENTOMOLOGICAL SOCIETY

The Chicago Entomological Society meets regularly in the Reading Room of the Academy on the third Sunday of every month from October to the following May. During the summer field meetings are held on various occasions as agreed upon by the members. A varied program is planned for the ensuing meetings, that for March to be on the subject of beetles (Coleoptera), the discussion to be led by Maurice L. Bristol of Elgin, Illinois.

The society desires to increase its membership. It is an ideal means of becoming acquainted for all who are interested in the entomological field of the study of natural history, either as a hobby or professionally. Among the activities of the society are the study of the insect fauna of America north of Mexico, particularly that of the Chicago Area. Early stages and life history are given special attention and records are kept of experiences and results accomplished, and it is hoped to publish such accumulated data, when possible, in the form of a local list.

The exhibition of interesting specimens or collections is encouraged and the less experienced workers are given assistance in identification. The exchange of ideas and practice in breeding specimens and the exchange of specimens between members have proven very helpful. Members will endeavor to advise home gardeners and tree lovers in protecting flowers, vegetables and trees against insect pests. Questions relating to any phase of insect life will be gladly answered.

Anyone interested in insects is cordially invited to attend meetings of the society.—Alex K. Wyatt, Secretary.

Museum Exhibits

After the museum lobby was redecorated last fall, an exhibit of winter birds of the Chicago Area was installed in one of the rebuilt cases on the south wall. In connection with this exhibit, Museum Leaflet No. 2, *Check List of Winter Birds of the Chicago Region,* by Edward R. Ford, was issued and made available for free distribution. It is planned to change the displays in the lobby from time to time and the present exhibit will soon be replaced by a series of migrating birds commonly seen locally in the spring.

A number of Earl G. Wright's paintings of birds have been displayed in the lobby during the last two months.

Although the various changes in office and laboratory space have required an appreciable amount of attention from members of the technical staff, work has continued on the small habitat groups for the Park Field Houses, some of which will shortly be ready for distribution. Progress has also been made on the systematic series of invertebrates on the second and third floors, and accessories of various kinds for use in connection with exhibits now in preparation have been collected in the field.

Collecting Insects

There is a definite element of sport in acquiring the skill needed to capture speedy dragon flies, super-heated vespids, and the gorgeous but fragile butterflies. Rearing the caterpillars for the study of the life histories of butterflies and moths is a fascinating pastime. The abundance and diversity of insect species furnish an infinite variety of opportunities for study as well as a pleasant recreation.

A new exhibit just installed in the lobby of the Academy offers suggestions for making an insect collection. Equipment and methods are demonstrated and sources of information are listed.

Big Fleas Have Little Fleas

By Robert Hegner

Williams and Wilkins Co., 1938, 8vo Cloth, vi, 285 pages, 127 figures. $3.00.

If the reader is looking for a discourse on the minute jumping friends indicated in this title he must look elsewhere, for Dr. Hegner's "fleas" are the microscopic protozoa of man's intestines, blood, and various organs. This rather specialized scientific exposition has been written with an attempt to make it humorous and interesting reading as well as informative, and shows much of the vigor characteristic of hybrids. The author has embellished his prose with verses and many cartoons calculated to amuse as well as to provide information and stimulation. Unfortunately, like many hybrids, some of the results are imperfect. Much of the humor falls flat, though even that may be effective, for a definite reaction, whether negative or positive, is better than the indifferent attitude of the general reader toward most texts. The illustrations of the book remind one of the style set by Van Loon with his simple pen and ink sketches. The information is set forth in as simple and straightforward a manner as possible, with all technical terms defined when used. Controversial material is well treated instead of dogmatically ignored as is common procedure in most elementary scientific books.

For an erudite scientific treatise the material might be better organized, but for popular consumption the slightly rambling style with not too prominent organization serves the purpose much better. Dr. Hegner begins by considering protozoa in general, giving some of their habits and general biology. He follows this by treating the various groups, both parasitic and free-living, in more detail. After a discussion of symbiotic and parasitic relations, he takes the reader on an exciting collecting expedition into the Philippine jungles in quest of protozoan parasites. Most of the remainder of the book is taken up more directly with the twenty-five species parasitic in man, closing with three chapters on tropical forms. He presents the history of the discovery of malarial parasites in detail, introduces us to the protozoans themselves, and considers the course of infection, cure and control of the disease.

Either as an interesting and informative bit of leisure reading, as a popular reference, or as a textbook this "who's who among the protozoa" is highly recommended.

—Donald C. Lowrie.

Wild Country

By F. Fraser Darling

Cambridge: at the University Press; Macmillan and Company, New York, 1938, 104 pages, 82 photographs. $2.75.

Do you have any books which you keep on your library table to look at when the spirit takes you and to read a bit here and there? Paragraphs to take you away to a pleasant spot; pictures to make you smile and reminisce? It's a good tonic. And Darling's *Wild Country* fills the bill.

An unusual book in its pleasant informality of text and its large number of excellent photographs—really a scrap book put together with feeling. The subtitle, "A Highland Naturalist's Notes and Pictures," explains this book about the beautiful islands and coasts of the Scotch Highlands.

—W. L. Necker.

Essays in Philosophical Biology

By William Morton Wheeler

Harvard University Press, 1939, xv, 261 pages, $3.00.

In these days of voluminous publications one rarely finds something that he cares to read over and over again. I suspect that if a census were taken of essays which are most frequently reread by naturalists, two or three of Wheeler's would be at the head of the list. Certainly the previously published volume of his essays, *Foibles of Insects and Men,* long out of print, is seldom on my shelf for long without being borrowed. The three favorites, "Dry-Rot of Our Academic Biology," "The Organization of Research," and "Termitodoxa, of Biology and Society," are fortunately reprinted in this new volume. As vital and up-to-date as they were when written twenty years ago, these three essays should be in the libraries of all biologists—and be read at least once a year! They are not merely provocative of thought, but actually inspiring in giving us wider horizons and more tolerant view points.

The art of writing well seems to be strangely lost to men of science; the late Professor William Morton Wheeler is the almost solitary exception to prove this rash generalization. The unquestioned leader in his field of science, professor of zoology at Harvard University, recipient of many scientific honors, possessed of a quiet and subtle, yet kindly, humor which pervades all his writing, Dr. Wheeler has been aptly characterized as "The only man . . . both worthy and able to sustain a conversation with Aristotle."

The little book has a short biographical introduction and twelve essays chosen by Dr. G. H. Parker. These range from critiques of modern biology and society to discussions of animal societies, in particular the ants which were Dr. Wheeler's primary field of research. Two biographical essays, one on Jean Henri Fabre and the other on Carl Akeley, further serve to show his versatility in a charmingly human manner.

To try to give the spirit of these essays would be futile. They are Dr. Wheeler's, and therefore inimitable!

—W. L. Necker.

Common Edible and Poisonous Mushrooms of Southeastern Michigan

By Alexander H. Smith

Cranbrook Institute of Science, Bulletin No. 14, Bloomfield Hills, Michigan, December, 1938. 71 pages, frontispiece, 8 diagrams, 15 plates. Paper, 50c; cloth, $1.00.

In writing this book the purpose of the author has been to present a popular guide to the mushrooms of southeastern Michigan. The arrangement of the material makes it unusually suitable for beginners in the study of mushrooms for characters which can be ascertained only by the use of the compound microscope are omitted. The parts of a mushroom are defined and the descriptive terminology in common use is explained.

In general the species presented are among the more conspicuous, thirty being illustrated by unusually detailed photographs. The best methods of collecting, how the various families differ, mushroom poisoning, and the growing and cooking of mushrooms are discussed. Mrs. Smith has contributed fifteen recipes to her husband's account of the proper preparation of these delicacies. Finally, an analytical arrangement and description of the fungi brings the volume to a close.

This book should prove a welcome addition to the popular literature, and for many will answer a need for a simple, clear, explanation of these very interesting plants.

—V. O. Graham.

NOTES FROM THE FIELD

A Chicago Plant Found Round the World

The distribution of a seed plant is limited by the ability of transporting agencies to carry the seeds. It is unusual, except in the case of weeds, to find the same species present on two continents. This is not true in the case of mushrooms. A considerable proportion of the fungous flora of the United States, Europe, and Japan is made up of the same species. It is therefore not surprising to read of cases of poisoning by the fly mushroom *(Amanita muscari)* in Japan and in Russia, as well as in the United States. The distribution of mushrooms can be illustrated in another way. The spores are smaller than the usual dust particle seen floating in a beam of sunlight. Such dust particles may travel on air currents for a great distance. In 1883, Mount Krakatoa, a volcanic mountain island, exploded with tremendous force. The entire island disappeared, but its dust rose seven miles into the atmosphere. During the next three years the Krakatoa dust floated seven times around the world producing red sunrises and sunsets of great beauty. Certainly the spores of mushrooms, which serve for them as seeds do for flowering plants, may likewise float to all parts of the earth. If the spores settle in a place favorable for germination, then the mushroom plant will there be found. Is it any wonder then that the fly amanita, or any other particular species, may be found in temperate climates all the way around the world?—V. O. Graham.

Buff Green-Snakes

Color anomalies in animals are always interesting, and, when they are other than albinism and melanism, extremely rare. Erythrism, or red coloration, has been reported in at least one animal, but the peculiar buff coloration of our local green- or grass-snake *(Opheodrys vernalis),* as far as I know, is still a unique case. During the past ten years six specimens of a light buff snake have been brought to me, each of which on inspection proved nothing more than an aberrant green-snake, which for some reason had lost the blue from its green, consequently leaving only the yellowish-buff. Theoretically the opposite should also occur; i. e., blue green-snakes, and one such example has been found. In alcohol, of course, the green is usually changed to a black-blue, which upholds the supposition that the green is merely a combination of blue and yellow "pigments."

The fact that four of the six buff snakes were young of the year, and that a brood from Kenilworth, Cook County, Illinois, was at first decidedly more inclined toward the buff than the normal coloration, although the green became more predominant later, again calls attention to the importance of studying young broods. The evolutionary significance of more variability in young than in old specimens is great. The abnormal young possibly have gene-linked (lethal?) characters with their aberrations, which are likely to cause death before maturity, thus giving a greater ratio of "sports" in young than in adults.—W. L. Necker.

TRAILSIDE MUSEUM

Maintained in Thatcher Woods by
The Forest Preserve District of Cook County
in cooperation with The Chicago Academy of Sciences

"Tarzan" and His Mate

Among the Trailside Museum's exhibits of live animals, the most interesting and popular are the pet raccoons, "Tarzan" and "Susan." They were secured last June when about seven weeks old. Reared in captivity, they have no fear of the public and during the summer they furnished amusement for many youngsters who enjoyed taking them on a leash for walks around the grounds.

Although larger at first, Tarzan has been out-grown by Susan who now weighs about nine pounds to his seven. He is much the darker, has a typically pointed "'coon face," and shuffles along flat-footed as do most of these little cousins of the bears. Susan is unusual in having a broader and more intelligent face and usually walks on the tips of her toes. She is quick and active, and everlastingly curious.

Both use their front paws as very capable hands. Their curiosity impels them to investigate everything. An exploratory paw is thrust into every crevice or hole, and every object within reach, be it an ant, spider, frog or just a bright pebble, is meticulously examined.

They eat almost anything acceptable as food and while they do not actually wash everything they touch, any food that is hard is soused in water and rolled and patted until it is a soft spongy mass. Water seems absolutely essential to their happiness.

Wrestling matches sometimes lasting

an hour or more are a common form of activity for these amusing pets. No holds are barred, for an ear, leg or tail often serves as a grip, and although Tarzan usually gets the worst of it, he does not seem to mind for Susan makes up for these occasional maulings in other ways. Even though she dominates him for the most part, she also guides and protects him, attacking anything that annoys him.

Inside the Museum their favorite trick is to go fishing, surreptitiously, in the aquarium. When they hear someone coming they scamper away like guilty children. Another one of their amusements is annoying the squirrel. They climb upon its cage and walk back and forth, apparently just to hear it scold!

In spite of their mischievous behavior they are most delightful pets. Their intelligence seems to equal that of a dog; they learn quickly and remember well.

Museum visitors seem surprised to learn that raccoons are still common in the Forest Preserves. They are infrequently seen, of course, because of their more nocturnal activities when in the wild. Their omnivorous food habits and relatively simple needs for shelter make it possible for them to maintain themselves successfully in almost any wooded area where they are given protection.

—Gordon Pearsall.

Sunday Morning Nature Walks

Beginning Sunday, April 2, Mr. Pearsall, curator of the Trailside Museum, will conduct a regular weekly series of Sunday morning nature walks in the Thatcher Woods Forest Preserve for the study of birds, trees, flowers, and other forms of wild life. Anyone interested is cordially invited. There will be no fees or admission charge.

Starting promptly at 8:00 o'clock from the Trailside Museum at Thatcher and Chicago Avenues, River Forest, each trip will last from an hour and a half to two hours. The series will continue each Sunday through the months of April, May, and June.

If sufficient interest is indicated, similar trips will be conducted also on Saturday afternoons. Under the guidance of one thoroughly familiar with local natural history, these walks furnish an ideal method of becoming acquainted with the wild life of the Chicago Area and it is hoped that nature lovers will take full advantage of these opportunities.

Bird Walks in Lincoln Park

Under the auspices of the Illinois Audubon Society bird study walks will be conducted in Lincoln Park on Saturday mornings during April and May. These trips will be under the direction of Miss Doris A. Plapp, the Secretary of the Society. Groups will assemble at the Academy promptly at 8 o'clock .

Another Hickory

In Pepoon's *Flora of the Chicago Region,* two species of hickory are listed within the forest preserve area. These are *Carya ovata* and *Carya cordiformis*—the shagbark and the yellow-bud hickory. In a recent trip with J. E. Coe through the woods east of Harms Road and south of Central Street in the Harms' Woods Forest Preserve, four or five small trees of *Carya alba,* the white shagbark hickory, were found. This tree differs from the other shagbark in having seven leaflets instead of five to each leaf.

—V. O. Graham.

Do You Know the Mammals?

Answers to questions on page 8:

1. True	7. True
2. False	8. True
3. False	9. True
4. True	10. False
5. False	11. False
6. False	12. False

THE NATURALISTS CALENDAR OF EVENTS

This department aims to bring together a chronological list of events and activities of general interest to naturalists of the Chicago Region. Organizations not represented in this issue are invited to send us their announcements for future numbers. For more detailed information write or telephone the office or representative of the organization in question.

CHICAGO ACADEMY OF SCIENCES, Lincoln Park at Clark and Ogden Ave., Diversey 5871.

CHICAGO AQUARIUM SOCIETY, Mr. Harmon K. Greene, Secretary, Plaza 2088. Meetings at the Harvey Restaurant, Strauss Building, third Wednesday of each month.

CHICAGO CACTUS SOCIETY, Mr. Frank K. Balthis, President, Garfield Park Conservatory, Van Buren 8100. Meetings last Sunday each month, Garfield Park Conservatory, 3:00 P. M.

CHICAGO ENTOMOLOGICAL SOCIETY, Mr. Alex K. Wyatt, Secretary, 5909 N. Virginia Avenue, Ravenswood 3115.

CHICAGO ORNITHOLOGICAL SOCIETY, Mr. Rudyerd Boulton, President, Field Museum, Wabash 9410. Meetings third Tuesday each month, Crerar Library, 8:00 P. M.

FRIENDS OF OUR NATIVE LANDSCAPE, Miss R. B. Eskil, 6016 Ingleside Avenue. Hyde Park 8313.

GEOGRAPHIC SOCIETY OF CHICAGO, 7 S. Dearborn, Randolph 5293. Resumes meetings in October.

ILLINOIS AUDUBON SOCIETY, Chicago Academy of Sciences, Diversey 5871.

MEN'S GARDEN CLUB OF THE CHICAGO REGION, Mr. O. V. Morgan, 404 Washington Street, Elmhurst, Secretary. Meetings second Thursday each month.

MID-WEST HORTICULTURAL SOCIETY, Administration Building, Garfield Park, Van Buren 8100. Meetings last Friday each month.

PRAIRIE CLUB, 38 S. Dearborn Street, Dearborn 3737.

STATE MICROSCOPICAL SOCIETY OF ILLINOIS, W. L. Necker, Chicago Academy of Sciences, Diversey 5871.

Mar. 12 Chicago Academy of Sciences, public lecture, *Visible Constituents of Coal,* Dr. E. C. Dapples, Academy Auditorium, 3:00 P.M.

Mar. 16 Amateur Herpetologists, *Zoo Experiences with Reptiles,* Emil Rokowski, Academy Auditorium, 7:30 P.M.

Mar. 17 State Microscopical Society of Illinois, *Foraminifera,* C. H. Krutcheon, Academy Auditorium, 8:00 P.M.

Mar. 19 Prairie Club walk, West Chicago to Winfield, 8 miles.

Mar. 19 Chicago Entomological Society, *Coleoptera,* Maurice L. Bristol, Children's Library of The Chicago Academy of Sciences, 2:00 P.M.

Mar. 21 Prairie Club, open meeting, *Along the Trail,* Mrs. Leota Gregory Thomas, Fullerton Hall. Telephone Prairie Club office for tickets.

Mar. 21 Chicago Ornithological Society, Crerar Library, 8:00 P.M.

Mar. 25 Prairie Club walk, Braeside, 5 miles.

Mar. 25 Field Museum, public lecture, *Africa Speaks Again,* Dr. Paul C. Hoefler, 2:30 P.M.

Mar. 26 Prairie Club walk, Baileytown, 10 miles.

Mar. 26 Chicago Cactus Society, Garfield Park Conservatory, 3:00 P.M.

Mar. 28 Geographic Society of Chicago, illustrated lecture, *Holland in Tulip Time,* Branson De Cou, Orchestra Hall (Members only).

Mar. 31 Mid-West Horticultural Society, Administration Building, Garfield Park, 8:00 P.M.

April 1 Prairie Club walk, Willow Springs Circle, 5 miles.

April 1 Field Museum, public lecture, *The Basket Maker Indians in Eighth Century Colorado,* Dr. Paul S. Martin, 2:30 P.M.

April 2 Prairie Club walk, Edgebrook, 6 miles.

April 7 Illinois Audubon Society, public lecture and motion pictures in color, Dr. Olin S. Pettingill, Jr., Academy Auditorium, 8:00 P.M.

April 8 Field Museum, public lecture, *Life Among the Alaskan Eskimos,* Elder C. Anderson, 2:30 P.M.

April 10 Chicago Academy of Sciences, Annual Meeting, public lecture, *Rediscovering Illinois,* Dr. Fay-Cooper Cole, Academy Auditorium, 8:00 P.M.

April 10 to April 16 Easter and Spring Flower Show, Garfield Park Conservatory and Lincoln Park Conservatory. 8:00 A.M. to 10:00 P.M.

April 15 Field Museum, public lecture, *Colorful Caribbean Shores,* William B. Holmes, 2:30 P.M.

April 16 Chicago Entomological Society, Children's Library of The Chicago Academy of Sciences, 2:00 P.M.

April 18 Chicago Ornithological Society, Crerar Library, 8:00 P.M.

April 19 Chicago Aquarium Society, Auditorium, Chicago Academy of Sciences, 8:00 P.M.

April 20 Amateur Herpetologists, talk by Karl P. Schmidt, Academy Auditorium, 7:30 P.M.

April 21 State Microscopical Society of Illinois, Academy Auditorium, 8:00 P.M.

April 22 Field Museum, public lecture, *Mysterious Kinabalu,* Harold J. Coolidge, Jr., 2:30 P.M.

April 28 Mid-West Horticultural Society, Administration Building, Garfield Park, 8:00 P.M.

April 29 Field Museum, public lecture, *Western Wild Flowers,* John Claire Monteith, 2:30 P.M.

April 30 Chicago Cactus Society, Garfield Park Conservatory, 3:00 P.M.

May 16 Chicago Ornithological Society, Crerar Library, 8:00 P.M.

May 17 Chicago Aquarium Society, Auditorium, Chicago Academy of Sciences, 8:00 P.M.

May 18 Amateur Herpetologists, reports of recent literature in herpetology and field notes, Academy Auditorium, 7:30 P.M.

May 19 State Microscopical Society of Illinois, Academy Auditorium, 8:00 P.M.

May 21 Chicago Entomological Society, Children's Library of The Chicago Academy of Sciences, 2:00 P.M.

May 26 Mid-West Horticultural Society, Administration Building, Garfield Park, 8:00 P.M.

May 28 Chicago Cactus Society, Garfield Park Conservatory, 3:00 P.M.

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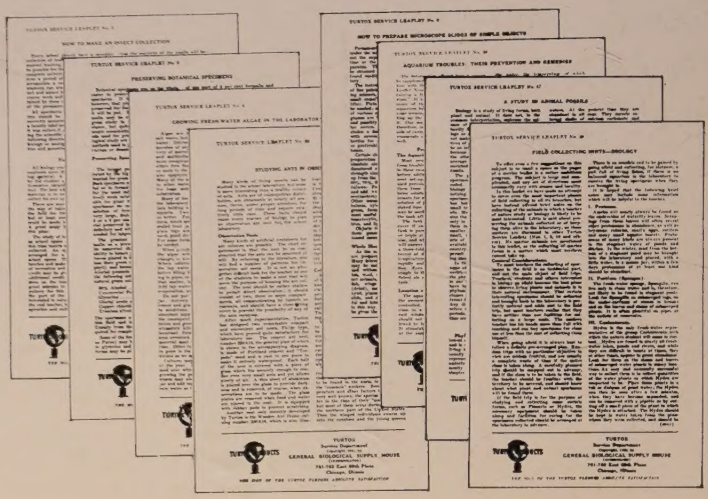

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